AMENDMENTS TO THE CLAIMS

1. (Amended) A semiconductor apparatus including a MOS transistor, said MOS transistor comprising:

a semiconductor substrate configured to provide a channel region between a source and a drain; and

a gate electrode formed ~~on~~ over the semiconductor substrate ~~via~~ and over a gate oxide film;

wherein a source side of the channel region has a first channel impurity density and a drain side of the channel region has a second channel impurity density different from the first channel impurity density, the difference in channel impurity density producing a threshold voltage of ~~a~~ the source side region of the MOS transistor which is higher than that of ~~a~~ the drain side region in a longitudinal direction of the channel region.

2. (Canceled).

3. (Withdrawn) The semiconductor apparatus according to claim 1, wherein said threshold voltage of the source side region is designed higher by differentiating the gate electrode in the source and drain side regions in a work function in the channel longitudinal direction.

4. (Withdrawn) The semiconductor apparatus according to claim 1, wherein said threshold voltage of the source side region is designed higher by differentiating the gate oxide film in the source and drain side regions in a film thickness in the channel longitudinal direction.

5. (Currently amended) The semiconductor apparatus according to claim 1 further comprising an impurity diffusion layer formed between the source and drain;

wherein said channel region is formed from a drain side channel region ~~being~~ formed between the drain and the impurity diffusion layers, and the source side channel region ~~being~~ formed between the impurity diffusion layer and the source;

wherein said gate electrode includes a drain side gate electrode formed on the drain side channel region via a drain side gate oxide film, and a source side gate electrode formed on the source side channel region via a source side gate oxide film;

wherein said source side region at least includes the source, the impurity diffusion layer, the source side channel region, the source side gate oxide film, and the source side gate electrode so as to collectively form a source side MOS transistor; and

wherein said drain side region at least includes the drain, the impurity diffusion layer, the drain side channel region, the drain side gate oxide film, and the drain side gate electrode so as to collectively form a drain side MOS transistor.

6. (Canceled).

7. (Withdrawn) The semiconductor apparatus according to claim 5, wherein said source and drain side gate electrodes are different in a work function from each other.

8. (Withdrawn) The semiconductor apparatus according to claim 5, wherein said source and drain side gate oxide films are different in a thickness from each other.

9. (Withdrawn) A semiconductor apparatus comprising a current mirror circuit having a pair of MOS transistors connected to each other at their gate electrodes, the gate electrodes being connected to one of their drains, wherein each of said pair of MOS transistors is formed from the MOS transistor as claimed in claim 1 or claim 5.

10. (Withdrawn) A semiconductor apparatus having a differential amplifier circuit using the current mirror circuit as claimed in claim 9 as a constant current load.

11. (Withdrawn) A semiconductor apparatus including a reference voltage generation circuit, said reference voltage generation circuit comprising:

a depletion type MOS transistor configured to serve as a constant current source, a gate and a source of said depletion type MOS transistor being connected to each other; and

at least one enhancement type MOS transistor serially connected to the depletion type MOS transistor;

wherein said depletion type MOS transistor is formed from the MOS transistor as claimed in claim 1 or claim 5.

12. (Withdrawn) A semiconductor apparatus including a voltage detection circuit, said voltage detection circuit comprising:

a division resistance arranged to divide an input voltage and supply a division voltage;

a reference voltage generating circuit operative to supply a reference voltage;

a differential amplifier circuit operative to compare the division voltage and the reference voltage;

wherein said differential amplifier circuit includes the differential amplifier circuit as claimed in claim 10.

13. (Withdrawn) A semiconductor apparatus having a constant current circuit, said constant current circuit comprising:

an output driver operative to control outputting of an input voltage;

a division resistance operative to divide the input voltage and supply a division voltage;

a reference voltage generation circuit operative to generate and supply a reference voltage; and

a differential amplifier circuit arranged to compare the division voltage with the reference voltage, said differential amplifier circuit controlling the output driver to operate in accordance with a comparison result;

wherein said differential amplifier circuit is formed from the differential amplifier circuit as claimed in claim 10.

14. (Withdrawn) A semiconductor apparatus including a ring oscillator, said ring oscillator comprising:

a plurality of inverter circularly connected to each other; and

a constant current circuit operative to supply a power to the inverter circuit;

wherein said constant current source is formed from the MOS transistor as claimed in claim 1.

15. (Withdrawn) A semiconductor apparatus including a voltage detection circuit, said voltage detection circuit comprising:

a division resistance arranged to divide an input voltage and supply a division voltage;

a reference voltage generating circuit operative to supply a reference voltage;

a differential amplifier circuit operative to compare the division voltage and the reference voltage;

wherein said reference voltage generation circuit includes the reference voltage generation circuit as claimed in claim 11.

16. (Withdrawn) A semiconductor apparatus having a constant current circuit, said constant current circuit comprising:

an output driver operative to control outputting of an input voltage;

a division resistance operative to divide the input voltage and supply a division voltage;

a reference voltage generation circuit operative to generate and supply a reference voltage; and

a differential amplifier circuit arranged to compare the division voltage with the reference voltage, said differential amplifier circuit controlling the output driver to operate in accordance with a comparison result;

wherein said reference voltage generation circuit is formed from the reference voltage generation circuit of claim 11.